

## **FOLDED COMPOSITE PRODUCT AND METHOD OF MAKING**

### **FIELD OF THE INVENTION**

The present invention relates to image products. In particular to image products having images on both sides and which are folded.

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### **BACKGROUND OF THE INVENTION**

It is well known to provide photographic prints which are typically displayed in the form produced or placed into a mounting structure such as a frame or album. These mounting structures help maintain the integrity of the photographic print preventing damage to the print caused by inadvertent bending 10 or folding of the print. Folding of the print causes the photographic emulsion to crack and thus destroy the appearance of the print.

An additional problem with the display of photographic prints is the size of the mounting structures are required to be larger than the photographic print. This is especially true with oversize photographic prints such as posters, 15 panoramic prints, or enlargements. Thus the prints must be stored in an area that is larger than the original print.

Another problem with the prior art is the difficulty with storing a collection of different size photographic prints in a single storage structure. In the prior art the album is at least as large as the largest print contained therein. Thus 20 there is a need to provide a structure that allows the compact storage of images of various sizes.

It is known in the prior art to provide dual sided album pages such as disclosed in US Patent Nos. 5,791,692 ; 5,957,502; and 6,004,061. However, the display of images on these pages is limited to the size of the single folded 25 album page.

Thus there is a need to provide a improved photographic image product and method of making same to minimize or avoid the problems of the prior art.

### **SUMMARY OF THE INVENTION**

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In accordance with one aspect of the present invention there is provided a dual sided integral composite image product, comprising:

a first support substrate having a separate image layer thereon;  
a second support substrate having separate image layer thereon, the second support substrate being secured to the first support substrate so as to form the dual sided integral composite image product; the integral composite image product having a fold line about which the integral composite image product may be folded.

In accordance with another aspect of the present invention there is provided a dual sided folded image product comprising;

*Sub. B1>* a sheet having a first side and a second side, the first side having an image layer separate from the sheet, the sheet having two spaced fold lines which form a central section and a first side section and a second side section, the central section being positioned between the first and second side sections, the side sections being folded on the so that the image layer is exposed.

In accordance with yet another aspect of the present invention there is provided a dual sided image product comprising:

a support substrate having a first side and a back side, the first side having an image layer separate from the support substrate, the support substrate having at least one fold line about which the support is folded for forming the image product.

In accordance with still yet another aspect of the present invention there is provided an image product comprising:

*Sub. B2>* a composite cover having a first support substrate having a separate image layer thereon, and a second support substrate having separate image layer thereon, the second support substrate being secured to the first support substrate so as to form the dual sided integral composite image product; the integral composite image product having a fold line about which the integral composite image product may be folded;

*Sub. B3>* at least one leaf having a first support substrate having a separate image layer thereon, and a second support substrate having separate image layer thereon, the second support substrate being secured to the first support substrate so as to form the dual sided integral composite image product; and

an attaching member for securing the at least one leaf to the cover.

In accordance with another aspect of the present invention there is provided a method for making a dual sided composite image product, comprising the steps of:

5 providing a first support substrate having a first side and a second side, the first side having an image layer separate from the substrate;

providing a second support substrate having a first side and a second side, the first side having an image layer separate from the substrate;

10 securing the first substrate to the second substrate so as to form a composite image product;

forming a fold line on the composite image product; and

folding composite image product about the fold line.

In still another aspect of the present invention there is provided a method of making a folded dual sided image product comprising the steps of:

15 providing a composite image product having first image layer and a second image layer secured together; and

forming a fold line on the composite image product about which the composite image product may be folded.

In accordance with another aspect of the present invention there is provided a dual sided integral composite image product, comprising:

*Sub. B4* > a first support substrate having a separate image layer thereon;

*Sub. B5* > a second support substrate having separate image layer thereon, the second support substrate being secured to the first support substrate so as to form the dual sided integral composite image product; the integral composite image product having a fold line about which the integral composite image product may be folded;

an attachment section integrally formed with the first and/or second substrate.

*Sub* > In accordance with another aspect of the present invention there is provided an integral image product, comprising:

*A1* > a first support substrate;

*sub  
P2* a second support substrate having separate image layer thereon, the second support substrate being secured to the first support substrate so as to form the dual sided integral composite image product; the integral composite image product having a fold line about which the integral composite image product may 5 be folded;

an attachment section integrally formed with the first and/or second substrate.

In accordance with still another aspect of the present invention there is provided an image product, comprising:

*sub  
P3* 10 a support substrate having separate image layer thereon, the support substrate having a plurality of fold lines about which the image product may be folded; and

*sub  
P4* 15 an attachment section integrally formed with the first and/or second substrate.

These and other aspects, objects, features and advantages of the present invention will be more clearly understood and appreciated from a review of the following detailed description of the preferred embodiments and appended claims, and by reference to the accompanying drawings.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

20 In the detailed description of the preferred embodiments of the invention presented below, reference is made to the accompanying drawings in which:

Fig. 1 is perspective view of an integral composite image product made in accordance with the present invention;

25 Fig. 2 is a perspective view of the integral composite image product of Fig. 1 folded in accordance with the present invention;

Fig. 3 is a perspective view of a modified integral composite image product made in accordance with the present invention;

30 Fig. 4 is a perspective view of the folded integral composite image product of Fig. 3;

Fig. 5 is a perspective view of another modified album leaf made in accordance with the present invention in the unfolded condition;

Fig. 6 is a perspective view of the album leaf of Fig. 5 in the folded condition;

5 Fig. 7 is a perspective view of album leaf of Figs. 5, 6 provided in the unfolded condition as mounted in an album cover;

Fig. 8 is a perspective view similar to Fig 7 illustrating the album leaf in the folded state;

10 Figs. 9a, 9b, 9c, 9d are enlarged partial views of the leaf of Fig. 7 illustrating how one of the openings may be mounted to the album cover;

Fig. 10 is a side elevational view of the album leaf and cover of Fig. 8 as taken along the line 10-10;

15 Fig. 11 is a perspective view illustrating how the fold line may be made;

Fig. 12 is an enlarged view of the fold area illustrated in Fig. 11;

Fig. 13 is an enlarged cross sectional view illustrating another method by which the fold line may be produced;

Fig. 14 is an enlarged cross sectional view illustrating how the fold lines of the album leaf of Fig. 5 may be formed;

20 Figs. 15a – 15d are perspective views which illustrate the sequential steps needed to make and fold a modified composite image product in accordance with the present invention;

25 Figs. 16a – 16e are perspective views which illustrate the sequential steps need to make and fold another composite image product in accordance with the present invention;

Figs. 17a, b are perspective views which illustrate yet another modified image product made in accordance with the present invention

#### **DETAILED DESCRIPTION OF THE INVENTION**

Referring to Figures 1 and 2, there is illustrated an integral 30 composite image product 10 made in accordance with the present invention. In the particular embodiment illustrated, the integral composite image product 10

comprises an album page (leaf) such as disclosed in US Patent Nos. 5,791,692 ; 5,957,502; and 6,004,061. The integral composite image product 10 comprises a first substrate 12 and a second substrate 14 each having an emulsion layer thereon upon which images 16 may be provided. In the particular embodiment illustrated, 5 the first and second support substrates 12, 14 are made from a single sheet of media that has been folded back upon itself as more fully described in US Patent Nos. 5,791,692 ; 5,957,502; and 6,004,061 which are hereby incorporated by reference. However, the present invention is not so limited. If desired the two substrates may each comprise a cut sheet, the cut sheets secured together so as to 10 form an integral composite structure 10. In the particular embodiment illustrated, the support substrates 12, 14 comprise photographic media having an emulsion layer thereon capable of receiving and retaining images as is typical with prior art photographic paper. Since the emulsion layer is separate from the support substrates 12,14 when the substrates 12, 14 are folded, care must be taken to 15 minimize any potential damage to the image formed thereon. As is typical with prior art photographic paper, they are not designed to be folded.

With the advent of digital printing, it is now possible to compose images on photographic paper in any combination of desired sizes and formats. This now has allowed for the easy production of album pages as described in the 20 above referenced patents.

The album page 10 is provided with a fold line 18 for allowing folding and unfolding of the album page 10 for allowing viewing of the images 16 contained within the folded section. Figure 2 illustrates the album page 10 in the folded position. The fold line 18 is constructed in such a manner so as to 25 minimize potential damage to the images 16 thereon. Referring to Figure 11, there is illustrated an enlarged view of the fold line 18 and how it may be made. In particular, the fold line 18 may be made using a embossing disc 80 and mating die 82. The embossing disc 80 is preferably placed on the side of the album page 10 which forms the inside of the folded album page 10. The fold line 18 is preferably 30 constructed so as to provide a hinge that allows the support substrates 12,14 to be repeatedly folded and unfolded. In the particular embodiment illustrated, the

album page 10 is shown as a free standing product. However, the album page 10 may be provided with means for securing the album page 10 in an album as is discussed later herein.

Referring to Figs. 3 and 4, there is illustrated another image product 5 30 made in accordance with the present invention like numerals indicating like parts and operation as previously discussed. In this embodiment, there is provided a pair of fold lines 32, 34 which are each similar in construction to fold line 18 as previously discussed. The fold lines 32 and 34 divide the image product into three sections: a central section 36, a first side section 38 and second side section 40, the 10 central section being positioned between the two side sections 38, 40. In the embodiment illustrated, the central section 36 has a width W and each of the side sections 38 have a width W1 and W2 respectively. In the embodiment illustrated, the width W1 and W2 are such that when in the folded position as illustrated in Fig 4 substantially the entire width W of central section 36 is covered. Thus the 15 ends 39, 41 of side sections 38, 40, respectively substantially abut. Preferably, the fold line abutting occurs approximately in the center of center section 36. As best illustrated by reference to Fig. 3, large images 44, 46 which extend across each of the sections` 36, 38, 40 are fully viewable when the image product 30 is in the unfolded state.

20 Referring to Figs. 5 –10 there is illustrated another modified image product 60 made in accordance with the present invention like numerals indicating like parts and operations as previously discussed. In the embodiment illustrated, image product 60 comprises an album leaf. Fig. 5 illustrates the image product 60 in the unfolded state and Fig. 6 illustrates the product 60 in the folded state. As 25 illustrated, the product 60 has a pair of spaced fold lines 61, 63 forming sections 71, 73, and 75. The fold lines 61, 63 are such that the product 60 is provided with a “Z” type fold so that the product 60 can fit within the album cover 62.

Fig. 7 illustrates the image product 60 in the unfolded state secured to album cover 62 for viewing of the images 16 thereon. Fig.8 illustrates the 30 image product 60 in the folded stated so that the album cover 62 may be closed.

The product 60 is provided with means for attaching or removing the product 60 from an album cover 62 as illustrated by Figs 7 and 8. In particular image product 60 is provided with a plurality of mounting openings 64 in a marginal area 65 of the product 60. The marginal area 65 is preferably provided to

5 avoid placing the openings 64 within the area containing images 16. The openings 64 are each designed to be releasably secured to an attaching member 66 provided in album cover 62. In the embodiment illustrated, the album cover 62 is constructed in such a manner illustrated by Fig.1 so that images can be provided on the inside and outside surfaces of the album cover 62. The images on the

10 album cover 62 may compliment the images provided on the image product 60 secured to the album cover 62.

Referring to Figs. 9a – 9d, there is illustrated a sequence of views illustrating in greater detail one of the openings 64 and how the product 60 may be attached to attachment member 66. Preferably, as illustrated, the opening 64 has a

15 general mushroom shaped configuration having a large retaining section 69 and a narrower connecting opening 70. A pair of score lines 72 are provided adjacent opening 64 so as to provide a degree of flexibility to the area surrounding connecting section 70. Fig. 9a illustrates the image product 60 prior to attachment. Fig. 9b illustrates the image product 60 as it is initially contacting

20 attachment member 66. Figs 9c and 9d illustrate the image product 60 secured to attachment member 66. To remove the image product 60, the image product 60 is simply pulled away from the attachment member 66.

It is of course to be understood that any desired means may be used for attaching the image product 60 to the album cover 62. For example, but not by

25 way of limitation, holes may be provided in a marginal area 65 which could engage rings provided in cover 62. Optionally, the album cover 62 may be omitted and a plurality of leafs 60 could be simply secured to one or more rings.

Referring to Fig. 11 there is illustrated one method in which the fold line as previously discussed may be formed in any of the previously discussed

30 image products made according to the present invention. Fig. 11 illustrates fold line 18 being formed in product 10. A embossing disc 80 is provided and is

5 moved relative to image product 10. Disposed on the opposite side of product 10 there is provided a die 82 having a groove 84. The embossing disc 80 is pressed against the product 10 and is positioned to engage the groove 84. A sufficient degree of force is applied against the product 10 by embossing disc 80 such that a

5 fold line 18 is produced as illustrated by Fig. 12.

As can be best seen by Fig. 12, the embossing disc 80 has an engaging surface 86 having a cross section profile so as to minimize damage to the product 10 yet produce a flexible hinge. The groove 84 has an inner surface 88 which corresponds generally to the configuration of surface 86. The shape of 10 surfaces 86, 88 will vary depending upon on the characteristics of the substrate being folded. When photographic media with plastic substrates, such as Kodak Duralife™ photographic paper manufactured by the Eastman Kodak Company or Kodak Image Magic Paper™ (thermal media) also manufactured by the Eastman Kodak Company, are being used, the surfaces 86, 88 are smooth and curved so as 15 to minimize potential damage to the substrate and images thereon. With these type of materials, there is little or no need to score or cut the substrate opposite the substrate to which the embossing disc 80 is applied.

When fiber-based media such as photographic paper is being used, the fold line 18 is produced by embossing disc 80 for producing an embossed 20 crease in the adjacent substrate 12 and an opposed cutting tool 90 for producing a cut in the adjacent substrate 14 as illustrated by Fig. 13. Preferably, the embossing disc 80 is applied to the side of the product 10 which folds inside. For example, embossing disc 80 is applied against substrate 12 of product 10 as shown in Fig. 1. Likewise, cutting tool 90 is applied against the opposing substrate 14 of product 25 10. This same technique can be applied to the "Z" fold product 60 shown in Fig. 6.

In Fig. 14, a plurality of embossing discs 80 are provided on 30 opposite sides of product 10 to compensate for the folding of the product 10 in different directions. It is to be understood that various other techniques can be used for forming fold lines, for example, but not limited to, the use of an embossing bar and die in place of embossing disc 80 and associated die 82.

Additionally, heat may be applied to the embossing disc 80 and/or die 82 for improving the fold characteristics of product 10 and forming a flexible hinge in plastic media.

In the embodiment illustrated in Figs. 17a – b, like numerals 5 indicating like parts and operation as previously discussed, only a single embossed crease 91 is needed on the side of the image product 30 disposed on the opposite side of the abutting edges 39, 41. This is due to the fact that the ends 39 41 provide a inherent folding area on the one side.

Referring to Figs. 15a – 15d, there is illustrated yet another integral 10 composite image product 96 made in accordance with the present invention like numerals indicating like parts and operation as previously discussed. Fig. 15a illustrates a printed media having images 16 printed on one side. This media can be produced by normal printing techniques whereby a plurality of images 16 are provided on web which is then cut to the appropriate length. Preferably, the media 15 is produced by digital printing techniques such that images can be properly composed thereon taking into account how the image product 96 is to be folded. In the particular embodiment illustrated, the image product 96 is divided into 10 sections 101, 102, 103, 104, 105, 106, 107, 108, 109, and 110. Sections 101 – 108 have images 16 formed thereon whereas sections 109 and 110 do not and will be 20 used to form an attachment section 112 by which the image product 96 is secured to an album cover 62. Fig 15b illustrates the media of 15a folded so as to form product substrates 12 and 14. In particular, sections 101 and 102 are folded against sections 103 and 104 whereas sections 105 and 106 are folded against sections 107 and 108. The folded sections are secured in any appropriate manner, 25 for example but not by way of limitation, by the application of an adhesive between the sections to be secured together. Thereafter as illustrated by Fig. 15c, the sections 109 and 110 are secured together in a similar manner to attachment section 112. Fig. 15d shows image product 96 in a first folded condition prior to closing. Fig. 15e shows image product 96 in its fully folded, closed condition 30 mounted in a closed album cover 62.

Referring to Figs. 16a – 16c, wherein yet another modified image product 120 made in accordance with the present invention like parts indicating like parts and operation as previously discussed. The image product 120 is similar to image product 96 except there is a different folding pattern. In this 5 embodiment, a smaller attachment section 112 is provided. Image product 120 includes image sections 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, and 144, and attachment sections 146 and 148. Images 16 are preferably provided on both sides of sections 122 through 144. Attachment section 112 is formed in the same manner as with image product 96. Figs 16b- 16d illustrate the sequence 10 of folding the image product 120.

It is of course of understood that any desired folding pattern may be used to provide an expanded unfolded image product.

It is understood that various modifications may be made apart from the scope of the invention. The present invention being defined as by the 15 following claims.